REMARKS

Applicants appreciate the Examiner's thorough examination of the subject application and request reconsideration of the subject application based on the foregoing amendments and the following remarks. Applicants also acknowledge with thanks the telephone conference with the Examiner regarding the outstanding Office Action and more particularly, the principal reference forming the rejections.

Claims 3, 4, 7, 9-16 and 22-30 are pending in the subject application. Claim 13 is acknowledged as being allowable by the Examiner.

Claims 3, 4, 9-12, 14-16 and 22-30 stand rejected under 35 U.S.C. §103.

Claims 3, 4, 7, 9-11, 15, 20, 24, 26, 28 and 29 were amended so as to more particularly provide that the light emission intensity/ the light emission intensity information/ the extracted light emission intensity is determined from one of a plurality of different light intensity values. Claims 22, 27 and 30 were amended for clarity. Claims 31 and 32 were added to more distinctly claim the fourth embodiment of the present invention. The amendments to the claims are supported by the originally filed disclosure.

35 U.S.C. §103 REJECTIONS

Claims 3, 4, 7, 9-12, 14-16 and 22-30 stand rejected under 35 U.S.C. § 103 as being unpatentable over the cited prior art for the reasons provided on pages 2-7 of the above-referenced Office Action. Because claims 1-2, 5-6, 8, 17-19 and 21 were canceled in the foregoing amendment, the following is limited to addressing the within rejection as to the

remaining claims, claims 3-4, 7, 9-12, 14-16 and 20. Because claims were amended in the foregoing amendment, the following discussion refers to the language of the amended claims, however, because these amendments comprise re-writing dependent claims in independent form, the amendments are not considered as being made to overcome the prior art reference(s). The following addresses the rejections provided in the above-referenced Office Action as to the following claims and/or groups of claims.

CLAIMS 3, 9, 11, 12, 15, 20, 22-30

Claims 3, 9, 11-12, 15, 20 and 22-30 stand rejected as being unpatentable over Palmer [USP 6,285,481] in view of Batey [USP 6,104,512] for the reasons provided on page(s) 2-6 of the above referenced Office Action. Applicants respectfully traverse as discussed below and also respectfully disagree with the characterizations in the Office Action of the disclosures of both of Palmer and Batey.

Applicants claim, claim 22, a digital optical communication device that includes an optical reception circuit, a decoding circuit, a reception light intensity level judgment circuit, a coding circuit and an optical transmission circuit. The optical reception circuit converts an optical signal received from any external source to an electric signal and the decoding circuit decodes the electric signal resultant from conversion by said optical reception circuit and judging whether or not the decoding is normally completed. The coding circuit codes the transmission data.

The reception light intensity level judgment circuit judges an intensity level of received light based on the electric signal resultant from conversion by said optical reception circuit. The circuitry

of the reception light intensity level judgment circuit for judging an intensity level of received light is configured so as to output one intensity level judgment signal of a plurality of different intensity level judgment signals, said one intensity level judgment signal being representative of one determined light emission intensity. The optical transmission circuit determines a light emission intensity based on result of the judgment by said reception light intensity level judgment circuit and result of the judgment by said decoding circuit and converts the transmission data coded by said coding circuit to an optical signal with the determined light emission intensity. The circuitry of the optical transmission circuit for converting the transmission data to an optical signal having the light emission intensity is configured so as to be capable of outputting optical signals having any one of a plurality of light emission intensities and wherein a specific one of the plurality of light emissions intensities is selected as said determined light emission intensity responsive to said one intensity level judgment signal.

Palmer describes a free-space laser communications error control system, more specifically a free-space atmospheric laser communications error control system. As indicated in Palmer, free-space atmospheric laser communication systems transmit and receive information by means of a light beam that propagates through the atmosphere. When used for air-to-air or air-to-ground communications, such systems pose a number of challenging problems. One such problem is that over long distances, or over short distances through a turbulent atmosphere, the beam is absorbed, diffracted and refracted, causing such problems as scintillation in the receiver. What the receiver sees is a "twinkling", like light from a star, where the beam can actually disappear and reappear in a millisecond. The disappearance of the beam is called a "dropout"

and such dropouts can disrupt normal communications if not controlled. Another form of disruption is attenuation of the beam due to absorption in haze, mist, fog, snow or other weather phenomenon. During such conditions, it is not uncommon to have the signal go from full-amplitude to nothing every few seconds (See col. 1, lines 5-30 thereof).

Palmer further indicates, that the effect on communications of this "channel property" takes two forms: data can be lost and/or data can be corrupted. This is a problem for interfacing a free-space atmospheric laser communication system with modern network systems, which are designed to operate with a fast, reliable, low-error transport media (the physical layer). Accordingly Palmer indicates that it is important to try to minimize or eliminate dropouts and to attain very low bit-error-rates (see col. 1, lines 31-39).

As to the control circuit comprising the invention in Palmer, Palmer provides that the circuit circumvents the problems of scintillation and other atmosphere-induced degradation of signal propagation in a free-space atmospheric laser communication system by transmitting a "signal strength" data stream between each pair of communicating laser transceivers. The signal strength data stream indicates the signal strength of the sending transceiver as actually received by the remote receiving transceiver. If the sending transceiver receives the signal strength data from the remote receiving transceiver indicating that the signal strength of the sending transceiver has fallen to or below a selected threshold, or if the sending transceiver cannot detect the signal strength data stream, then the sending transceiver suspends transmission of information packets (See col. 1, lines 41-55, Figure 3 and col. 4, lines 33-42). Palmer further indicates (e.g., see Figure 3 thereof and col. 3, lines 26-30) that the signal strength data stream

from the remote transceiver is monitored on a periodic and a continuing basis by a first control loop algorithm including the above checks on the signal strength and the data stream.

As to the periodicity, Palmer provides that it has been found that the effects of scintillation essentially do not change more rapidly than about 1 KHz. Thus, in the preferred embodiment in Palmer each transceiver samples the received signal strength data stream transmitted by the remote transceiver at a sufficiently high rate to properly forward predict the signal strength, more preferably the signal strength data stream date rate and the receiver sampling frequency are about 10 KHz. Thus, in the communication system disclosed and taught in Palmer, thousands of signal strength data signals are transmitted between the transmitting and receiving transceivers per second to control data transmission.

As to what occurs following suspension of information packets, Palmer provides that "After any suspension of transmission of information packets, the signal strength data stream from the remote transceiver is monitored on a periodic but continuing basis by a second control loop algorithm. As noted previously, when transmission of information packets is suspended, the communicating transceivers still attempt to send and to monitor the signal strength data stream." (See col. 4, lines 43-49). When it is determined that the signal strength has returned to an intensity level above the selected threshold, the sending transceiver resumes transmission of information packets. Palmer asserts that this technique prevents transmitting errors during periods of dropouts or low signal level due to scintillation or other causes. Palmer emphasizes a number of times therein that at all times, the laser communication system continues to transmit

the signal strength data stream between the transceivers even though information packets are not transmitted.

In the above-referenced Office Action it is asserted that Palmer teaches a reception light intensity level judgment circuit judging an intensity level of received light based on the electric signal resultant from conversion by said optical reception circuit and an optical transmission circuit determining a light emission intensity based on result of judgment by the reception light intensity judgment circuit. Applicants respectfully disagree with the foregoing broad assertion.

The circuitry in Palmer is not configured to judge the intensity level of the optical signals being received and adjusting the optical signals being transmitted based on the judged intensity level. As described in Palmer, the analog output of the photodetector 308, representing the signal strength of the incoming laser light is coupled to an analog-to-digital converter (ADC) 308. The digital output of the ADC 308 is coupled to an I/O processor 310. As stated in Palmer, the ADC 308 provides the processor 310 with a measure of the signal strength of the received signal, which is transmitted back to the remote transceiver in accordance with the invention described in Palmer. See col. 5, lines 10-25 of Palmer. As is described elsewhere in Palmer, this signal strength data is included in a signal strength packet that is transmitted to the remote transceiver.

Palmer also teaches that the receive packet processing circuit 306 provides a decoded signal strength data stream from the remote transceiver to the I/O processor 310 for processing as described in connection with Fig. 3 of Palmer. It is clear from the discussion relating to Fig. 3, that this signal strength data stream represents the strength of the optical signal being received by

the remote transceiver and that the I/O processor 310 uses this signal strength data stream to determine if optical signal transmission should be continued or interrupted.

Palmer further teaches that the I/O processor 310 is operably coupled to a digital-to-analog converter (DAC) 324. It is clear from the discussion in col 5, line 54 through col. 6, line 2, that the digital input signal to the DAC 324 is derived from the signal strength data stream from the remote transceiver and that the output of the DAC is an analog gain control signal to the laser driver 320.

In sum, Palmer nowhere describes a system or control circuit in which the signal strength of the laser light being received by a transceiver is used to control the intensity of the light be transmitted by that same transceiver.

In addition, claim 22 further provides that the reception light intensity level judgement circuit is configured so as to output one intensity level judgment signal of a plurality of different intensity level judgment signals, where the one intensity level judgment signal is representative of one determined light emission intensity. Claim 22 further provides that the circuitry of the optical transmission circuit for converting the transmission data to an optical signal having the light emission intensity is configured so as to be capable of outputting optical signals having any one of a plurality of light emission intensities, one for each of the intensity level judgment signals, and wherein a specific one of the plurality of light emissions intensities is selected as said determined light emission intensity responsive to said one intensity level judgment signal. In other words, there is provided a plurality of judgment signals one of which is outputted based on the judged intensity

level and the one of the plurality of light emission intensities corresponding thereto, is the one selected as the determined light emission intensity.

Such a circuit is nowhere taught or suggested anywhere in Palmer. This is not surprising as the function and purposes of this circuitry does not correspond in any fashion with the intended operation and function of the circuitry and system disclosed and taught in Palmer.

As indicated in prior remarks by Applicants, Batey, uses ACK for control of the light emission intensity. In contrast, according to the technique of the present invention the light emission intensity can be controlled without using ACK. In this respect, Batey and the present application fundamentally differ from each other in the concept supporting the means for achieving the object. Also, in order to control the light emission intensity according to the magnitude of the intensity of received light without using ACK, it is important to determine whether the intensity of the received light is the intensity of the signal itself or whether the intensity is influenced by noise. According to claim 3 of the present application, if the intensity of the received light is high but considerably influenced by noise, the light emission intensity is increased regardless of the magnitude of the intensity of the received light in order to make communication possible.

Batey also does not disclose, teach or suggest anywhere that the determination of the light emission intensity is determined one way if the decoding circuit determines if the decoding is complete and is determined another way if the decoding circuit determines if the decoding is not complete. As indicated herein, Batey describes the use of a number of iterative techniques for adjusting the intensity level and none of these techniques describe a methodology that

differentiates between when decoding is completed or not completed. In Batey an iterative procedure is implemented whereby the control circuitry increases or decrease the transmission power levels until it is found that a connection has been successfully established or maintained or until it is determined that no connection has been established even at max power. In other words, Batey just keeps trying different power levels in an iterative fashion without judging at any time what the power level or light emission intensity should be.

It is respectfully submitted that the foregoing remarks distinguishing claim 22 from the combination of references also applies to distinguish claims 23 and 27 from the combination of references. Applicants also would note that claim 23 includes the further limitation that the reception light intensity level judgment circuit compares the electric signal resultant from conversion by the optical reception circuit with a plurality of reference voltages, (i.e., different reference voltages) and judges the intensity level of the received light based on result of the comparison. Comparing the electric signal representative of the signal strength of the received light with a plurality of reference voltages is nowhere taught or disclosed in Palmer. As indicated above, Palmer only describes a circuit in which the signal strength data stream is evaluated to see if it is less than a single threshold value.

As indicated above, claims 3, 4, 7, 9-11, 15, 20, 24, 26, 28 and 29 were amended so as to more particularly provide that the light emission intensity/ the light emission intensity information/ the extracted light emission intensity is determined from one of a plurality of different light intensity values. As such, the foregoing remarks distinguishing claim 22 from the cited combination of references also applies to distinguish each of these claims as well. In

addition, at least certain of these claims (e.g., claim 3) further provides that each of the plurality of light emission intensity values corresponds to a different range of reception light intensities. This also is nowhere described or disclosed in Palmer.

In sum, Palmer and Batey, alone or in combination, do not disclose, teach or suggest, either explicitly or inherently, the digital optical communication device as set forth in any of claims 3, 9, 11-12, 15, 20 and 22-30. As such, these claims are considered to be distinguishable from the cited combination of references.

CLAIMS 4, 7, 10, 14 & 16

Claims 4, 7, 10, 14 and 16 stand rejected as being unpatentable over Palmer in view of Batey and further in view of Minteer [USP 6,188, 494"] for the reasons provided on pages 6-7 of the above referenced Office Action. Applicants respectfully traverse.

In the above-referenced Office Action, Minteer is used for the limit purpose of its teachings of the use of an optical fiber.

As indicated above, claims 3, 4, 7, 9-11 and 15 were amended so as to more particularly provide that the light emission intensity/ the light emission intensity information/ the extracted light emission intensity is determined from one of a plurality of different light intensity values. As to claims 14 and 16, these claims depend from claims 11 and 16 respectively. As such, the foregoing remarks distinguishing claim 22 from the cited combination of Palmer and Batey also applies to distinguish each of these claims as well. In addition, at least certain of these claims (e.g., claim 3) further provides that each of the plurality of light emission intensity values

corresponds to a different range of reception light intensities. This also is nowhere described or disclosed in Palmer or Batey.

As indicated previously by Applicants, communication by means of the optical fiber (wired communication) and infrared communication in space (wireless communication) as taught by Palmer completely differ from each other in terms of technique. Also, use of an optical fiber in the device as disclosed and taught in Palmer would render that device incapable of carrying out the intended purpose and function of that device. Accordingly, it is absolutely improper to compare Minteer disclosing the technique concerning the optical fiber with the present application, since the basic theory about communication is being ignored.

It is respectfully submitted that claims 4, 7, 10, 14 and 16 are patentable over the cited reference(s) for the foregoing reasons.

The following additional remarks shall apply to each of the above.

As provided by the Federal circuit, a 35 U.S.C. §103 rejection based upon a modification of a reference that destroys the intent, purpose or function of the invention disclosed in a reference, is not proper and the prima facie case of obviousness cannot be properly made. In short there would be no technological motivation for engaging in the modification or change. To the contrary, there would be a disincentive. *In re Gordon*, 733 F. 2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Moreover, if the proposed modification of combination of the prior art would change the principal of operation of the prior art invention been modified in the teachings of the references and a sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F. 2d 810,

123 USPQ 349 (CCPA 1959). See also MPEP 2143.01. Applicants respectfully submit that the modifications suggested in the above-referenced Office Action to the principal reference, Palmer, would yield a digital optical communication device or data communication method that would be totally incapable of performing the intended purpose or function of the invention as described in Palmer as well as changing the principal of operation of the communication device control circuit being described in Palmer.

As provided in MPEP 2143.01, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F. 2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F. 2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). As provided above, the references cited, alone or in combination, include no such teaching, suggestion or motivation. Further, when the teachings of Palmer and Batey are considered in their entirety, it can hardly be said that these shortcomings can be overcome by reference to knowledge of those skilled in the art.

Furthermore, and as provided in MPEP 2143.02, a prior art reference can be combined or modified to reject claims as obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 19866). Additionally, it also has been held that if the proposed modification or combination would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. Further, and as provided in MPEP-2143, the

teaching or suggestion to make the claimed combination and the reasonable suggestion of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). As can be seen from the forgoing discussion regarding the disclosures of the cited references, there is no reasonable expectation of success provided in any reference as to the suggested modification to the principal reference, Palmer. Also, it is clear from the foregoing discussion that the modification suggested by the Examiner would change the principle of operation of the control circuit disclosed in Palmer. Although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so." *In re Mills*, 916 F. 2d, 680, 682; 16 USPQ 2d 1430, 1432 (Fed. Cir. 1990). See also *In re Fritch*, 972 F. 2d 1260, 23 USPQ 2d 1780 (Fed. Cir. 1992).

As the Federal circuit has stated, "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260,1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor. *Para-Ordance Mfg. v. SGS Importers Int'l, Inc.*, 73 F.2d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995

The Federal Circuit also has indicated that a prior art reference that gives only general guidance and is not all that specific as to particular forms of a claimed invention and how to achieve it, may make a certain approach obvious to try, but does not make the invention obvious.

Ex Parte Obukowicz, 27 USPQ2d 1063, citing *In re O'Farrell*, 853 F.2d 894, 7 USPQ2d 1673,1-681 (Fed. Cir. 1988).

It is respectfully submitted that for the foregoing reasons, claims 3, 4, 7, 9-12, 14-16 and 22-30 patentable over the cited reference(s) and, therefore, satisfy the requirements of 35 U.S.C. §103. As such, these claims are allowable.

CLAIMS 31-32

As indicated herein claims 31-32 were added to more distinctly claims aspects/ embodiments of the present invention. More particularly, to more distinctly claim the fourth embodiment as identified in the subject application. Applicants respectfully submit that the added claims are patentable over the cited art forming the grounds for the within rejections.

It is respectfully submitted that the subject application is in a condition for allowance. Early and favorable action is requested.

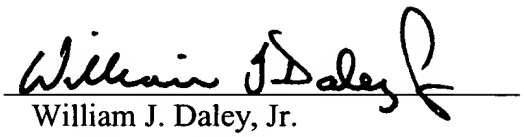
Applicants believe that additional fees are not required for consideration of the within Response. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed

for any excess fee paid, the Commissioner is hereby authorized and requested to charge Deposit

Account No. **04-1105**.

Respectfully submitted,
Edwards & Angell, LLP

Date: December 9, 2003

By: 

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